Documentation
for
shef_decoder_pro
November 2002, updated February 2003

1.0 General Information

1.1 Application Description

Once raw shef messages have been loaded into the database via the shef_decode_raw program, that data in the database and shef values coming in as processed data are moved to the next level via shef messages processed by the shef_decode_pro program. The program is run by oper and runs intermittently by means of a script provided with the initial software. Any message files placed in the processed queue will be processed by shef_decode_pro.

1.2 Design Considerations

Since the archive database design was based on CBRFC's fastetc database, the starting point for the shef_decode_pro application was the shef_decode_pro program used by CBRFC for the fastetc database. While similar to the IHFS shefdecoder, there are differences. One of the most notable is that there are 90+ shef message error conditions being checked in the IHFS decoder while there are only 40+ being checked in the CBRFC decoder. The error conditions are listed section 3.0. Another difference is the Archive decoder does not produce an intermediate output file. All manipulation of the message values is done in memory. Because of this, the Archive decoder should be much faster than the IHFS decoder.

1.3 Assumptions application makes

It is assummed that all the SHEF files contain processed data. Some of the sources of these files are the level 1 processsing applications and ofsshef.

An assumption made when choosing the fastetc decoder was that the decoder was in sync with the current IHFS decoder and was compliant with the most recent shef documentation

2.0 Configuration Information

Apps_defaults tokens

Tokens used by shef_decode_pro are listed below.

adb_name - archive database name, e.g., adb_ob1nhor
adb_shef_winpast - the number of days in the past which a shef message cannot be older than in order to be processed, e.g., 9999.
adb_shef_winfuture - the number of minutes into the future which a shef message must be newer than in order to be processed, e.g., 9999.

Currently the following token is not incorporated into the software but exist in the apps_defaults file for use by other programs developed by the Archive DB

adb_pro_que : /awips/hydroapps/rfc/local/q/pro/test/in # pathname for shef messages of processed values

The following tokens are optional and only need to be defined if the configuration file is not given as a parameter at runtime. The first 2 are used by both shefdecoders and the last one is used used by shef_decode_pro.

local_name_cfg - pathname for the configuration file
local_name_dir - pathname for home directory
local_adb_name -

shef_pro.cfg file

This is the shef_pro.cfg file that was delivered with the initial version of the Archive DB. See attachment A for details.

```
/rfc_arc_data/q/processed/
/rfc_arc/logs/decoder/processed/out/
/rfc_arc/logs/decoder/processed/err/
/rfc_arc/cfg/decoders/inputparm
/rfc_arc/logs/decoder/processed/logs/
/rfc_arc/logs/decoder/processed/remote/processed/in/
-SHEFOUT
-ERRORFILE
+SHEFPASS
PPH PPQ PPD HGH TAH TA QR LS QR QC QT QM QD QI
1M 1G 1Z 2M 2G 2Z 3M 3G 3Z RG RP RZ
```

inputparm file

This file is read by the shef_decode_pro program when it is first started. This file contains all the valid SHEF pedtsep codes and information needed to decode and validate SHEF messages. The file is very similar to the shefparm file used by the IHFS db shefdecoder but is not identical. The inputparm provided is based on SHEF version 2.0. and the file also includes the SHEF type/source codes the RFC Archive DB requested and received approval for in 2002. Attachment B contains a description and listing of this file.

<u>command line options</u>

The shef_decode_pro program has a build in help option for the command line arguements, this can be generated by typing: shef_decode_pro -?

```
shef_decode_pro -t -at -d -r -v -c CCYR -s -e -p -fcfg filename -informix name -howold # -loop # -y
```

where:

-t	execute test version
-at	turn on advanced testing
-d	turn on debug information
-r	turn on special revision flag
-v	turn on verbose option
-s	create file of unknown stations/sensors (INFORMIX VER)
-c CCYRMMDD	override system date with switch for testing
-e	write all INFORMIX errors to file
-p	only write lines with error when parsing shef
-fcfg filename	input configuration path/filename from command line
-informix name	input database name from command line
-howold #sec	number of seconds to wait before processing a file (default=10)
-y	copy each file to remote directory used to populate other databases
-loop #	# equals the number of iterations (files processed) before stopping (default=150)

3.0 User How-To

<u>Start and Stop Scripts</u>

Start and stop scripts have been provided to the user. These scripts use a similar concept as the start and stop scripts for the IHFS shefdecoder. These scripts can be found in the directory /rfc_arc/scripts/deocers and are called:

start_processed_decoder
stop_processed_decoder

Note that the start script does not currently check the user or hostname as the IHFS shefdecoder does.

Also provided for use by the user is a script called check_processed_decoder. This script if run routinely in oper's cron, monitors to see if the shef_decode_pro is running. If it is not found, the script will attempt to restart the shefdecoder and will send an e-mail to user oper's mailbox.

Parsing Errors/Warnings

The parsing portion of the shef_decode_pro program is not indentical to the IHFS db shefdecoder. While the IFHS db shefdecoder has 90 possible parsing warnings/errors, the archive db shefdecoder has only 40 parsing warnings/errors. The possible parsings warnings/errors are as follows:

Number	Message
1	Error No. 1 ->This line not decoded
2	Error No. 2 ->No space in positional data
3	Error No. 3 ->Less than 3 characters in ID of message source
4	Error No. 4 ->TZ code error
5	Error No. 5 ->Date group error-not enough digits or bad value
6	Error No. 6 ->Illegal character in Id or message source
7	Error No. 7 ->Error in date code
8	Error No. 8 ->Observation time error
9	Error No. 9 ->Date relative code error
10	Error No. 10 ->Julian day error ;
11	Error No. 11 ->Illegal data string qualifier
12	Error No. 12 ->Units code error",sizeof(err3_.message12));
13	Error No. 13 ->Not a date or data type element
14	Error No. 14 ->Not a date or data type...maybe missing slash",sizeof(err3_.message14));
15	Error No. 15 ->Illegal character in parameter code
16	Error No. 16 ->File read error on shef_parm
17	Error No. 17 ->Non-existent parameter code
18	Error No. 18 ->Parameters coded with a send code
19	Error No. 19 ->Continuation of a format does not follow the correct format
20	Error No. 20 ->A format revision continuation follows an original
21	Error No. 21 ->The format that this is continuing had an error
22	Error No. 22 ->Year not in the range 1976-2020 for local time zone use Z for time zone for historical data
23	Warng No. 23 ->Forecast data without creation date
24	Error No. 24 ->Bad data somehow
25	Error No. 25 ->DV not defined for ZZV
26	Error No. 26 ->DV code error ;
27	Error No. 27 ->DI code error

28 Error No. 28 ->Trace specified for other than PP,PC,SF,SD or SW

29 Error No. 29 ->No time increment specified

30 Error No. 30 ->Too many items in .B body line

31 Error No. 31 ->Bad character in the line

32 Warng No. 32 ->Not enough items in .B body line

33 Error No. 33 ->No value specified

34 Error No. 34 ->No .END at end of .B ;

35 Error No. 35 ->Zulu,DR or DI coded with send code QY,PY or HY

36 Error No. 36 ->The explicit date referenced by DRE is not the end of the month

37 Error No. 37 ->Obervation or creation time is between 020001 and 025959 on the date of change from standard to daylight time

38 Warning No.38 ->No check for daylight savings time-year out of bounds [1976-2020]",sizeof(err8_.message38));

39 Error No. 39 ->Embedded database comments with internal comments not allowed",sizeof(err8_.message39));

40 Error No. 40 ->Database comment too long",sizeof(err8_.message40));

Posting Warnings/Errors

Posting errors are not written to the individual message error output files. Posting errors are available for viewing only when the command line argument -e is specified. When this option is specified, posting errors are written to the file sql.errors in the /rfc_arc/logs/decoder/pro/logs directory. Note that this is an ever growing file and can get quite big over time.

4.0 Log File

The shef_decoder_pro program generates a daily log file. The format of this log file is based on the CBRFC shefdecoder for the fastetc db. This file stays static in size and reports information on how many values for various SHEF codes were processed. An example of this log file is shown in Attachment C..

5.0 Troubleshooting Information

Check the log files. If the log files don't indicate any problem, then consider running the shef_decode_pro with the -d option (turn on debug information) and/or the -v option (turn on verbose option).

6.0 Installation Instructions

"under construction"

7.0 Maintenance Information

Originating Programmer/Office: Toth, Monica
NWS/OHD/HL
Silver Spring, MD

Maintenance programmer/Office: NWS/OHD/HL
Silver Spring, MD

8.0 References

NWS Manual 10-942 Standard Hydrometeorological Exchange Format (SHEF) Manual

RFC Archive DB Team Request for Change to SHEF submitted February 28, 2002.

Attachment A - configuration file

THE CONFIGURATION FILES IN THE DISTRIBUTION LOAD COME AS INDICATED BELOW.

The configuration files for each decoder, 'shef_xxx.cfg' must be set up correctly for the decoder to operate. It provides a flexible way for the user to provide directory paths and some options to the decoder. DO NOT ADD EXTRA LINES to the configuration file.

A typical configuration file, along with a description, is shown below.

```
/q/calmonly/in
/q/calmonly/out
/q/calmonly/err
/lib/inputparm
/logs/raw
/q/remote/raw/in
-SHEFOUT
-ERRORFILE
+SHEFPASS
PPM SWI QCM
RM RG RZ 1M 2M 3M 4M 1Z 2Z 3Z 4Z 1G 2G 3G 4G
```

line 1 - > /q/calmonly/in

The path name of the directory where your data files are to be placed.

When executed, the decoder will look in this directory and attempt to decode every file, until the directory is empty. The decoder will bypass sub-directories and files that begin with a '.'. As files are decoded, they will automatically be removed from the directory.

line 2 - > /q/calmonly/out

The path name of the directory where the decoder will write the SHEF output files, if desired.

These files can be used to debug the SHEF message. They are readable files which contain the parsed off shef data. If the flag SHEFOUT is set to -SEHFOUT, no output will be written. (see line 5).

line 3 - > /q/calmonly/err

The path name of the directory where the decoder will write any error files if the ‘-s’ and

'-e' command line options exist. Other shef decode errors are also written to this directory (See line 6 for the ERRORFILE flag).

line 4 - > /lib/inputparm

The path and file name (i.e. inputparm) of where to find the parameter file used by the decoder.

line 5 - > /q/logs

The path name of the directory where the decoder will write the stats log.

line 6 - > /q/remote/raw/in

The path name of the directory where the decoder will write a copy of all files. This option is turned on by using the '-y' command line switch. This option can be used to populate alternate queues for remote databases, etc.

line 7 - > -SHEFOUT or +SHEFOUT

FOR SWS POSTERS, LEAVE THIS OPTION SET OFF...unless you want to periodically see shefout files.)

The two options for this line are: +SHEFOUT or -SHEFOUT

+SHEFOUT
Always create a SHEF output file.
YOU WILL WANT THIS OPTION SET TO ON OR +.

-SHEFOUT
Do not create a SHEF output file.

line 8 - > +ERRORFILE or -ERRORFILE

The errorfile contains the data message, the parsed and decoded elements, and the encoded SHEF message. It also contain any parsing errors.

The two options for this line are: +ERRORFILE or -ERRORFILE
The '+ option always write an error file, even if there are no errors. Initially, you will probably want to turn this on so that you can monitor if you decoder is working. After testing,
you will probably want this off, or your directory could fill up fast.

-ERRORFILE

Only write an error file if there are errors.
THIS IS NORMALLY THE OPTION TO SET after initial testing.

+ERRORFILE
Always write error messages, even if there are no errors.

NOTE: If the '-p' option is set on from the command line, only the error which have error will print out.

line 9 - > -SHEFPASS or +SHEFPASS

Leave this option set to:
+SHEFPASS

This is an internal hook that users can use to directly pass data to a DB such as INFORMIX.

line 10 - > desired SHEF PED (PE and Duration) Codes

This line allows the user to determine which SHEF values are to be passed to the database. It will also determine which codes statistics will be kept on in the stats file located in the {local_sws_post_dir}/logs directory.

line 11 - > desired TS codes

This line allows the user to determine (in conjunction with PED codes in line 7) which values are to be passed to the DB. It will also determine which codes statistics will be kept on in the stats file locate in the /logs/raw directory.

Attachment B - inputparm file

File Description

The file is a ASCII text file with the following record structure:

Columns	Contents
Command card (indicates which parameters are to follow):	
	1-2 *n
	where n is one of the following:
	1 = Physical element codes
	2 = Duration codes
	3 = Type/Source codes
	4 = Extremum codes
	5 = Probability codes
	6 = Send codes or duration defaults
	* = end of data
4	0
Physical element codes:	
1-2	Physical element code
4-23	Conversion factor metric to English
Duration codes:	
1	Duration code
4-8	The integer translation of the duration code
Type/Source codes:	
1-2	Type/Source code
4-5	1.0 to indicate it is used
Extremum codes:	
1	Extremum code
4-5	1.0 to indicate it is used

Columns	Contents
Probability codes:	
1	Probability code
3-22	The equivalent probability

Send codes or duration defaults:

1-2 Physical element or send code

4-11 The fully expanded parameter code for send codes or the three-character 'PED' combination for duration defaults

12-13 For send codes, place a '1' in this column if the observe time is the previous 7 AM otherwise place a ‘0' in this column

Comments any comments included in the file must be after the ** 0 line.

File Listing

```
*1 0
AD 1.0
AF 1.0
AG 1.0
AM 1.0
AT 1.0
AU 1.0
AW 1.0
BA 0.0393701
BB 0.0393701
BC 0.0393701
BD -1.0
BE 0.0393701
BF 0.0393701
BG 1.0
BH 0.0393701
BI 0.0393701
BJ 0.0393701
BK 0.0393701
BL 0.0393701
BM 0.0393701
BN 0.0393701
BO 0.0393701
BP 0.0393701
BQ 0.0393701
CA 0.0393701
CB 0.0393701
CC 0.0393701
CD 0.0393701
CE 0.0393701
CF 0.0393701
CG 0.0393701
CH 0.0393701
CI 0.0393701
CJ 0.0393701
CK 0.0393701
CL -1.0
CM -1.0
CN 1.0
CO 1.0
```

CP	0.0393701
CQ	0.0393701
CR	0.0393701
CS	0.0393701
CT	1.0
CU	-1.0
CV	-1.0
CW	0.0393701
CX	0.0393701
CY	0.0393701
CZ	1.0
EA	0.0393701
ED	0.0393701
EM	0.0393701
EP	0.0393701
ER	0.0393701
ET	0.0393701
EV	0.0393701
FA	1.0
FB	1.0
FC	1.0
FE	1.0
FK	1.0
FL	1.0
FP	1.0
FS	1.0
FT	1.0
FZ	1.0
GD	0.3937008
GR	1.0
GS	1.0
GT	0.3937008
HA	3.2808399
HB	3.2808399
HC	3.2808399
HD	3.2808399
HE	3.2808399
HF	3.2808399
HG	3.2808399
HH	3.2808399
HI	1.0
HJ	3.2808399
HK	3.2808399
HL	3.2808399
HM	3.2808399
HN	3.2808399
HO	3.2808399
HP	3.2808399
HQ	1.0
HR	3.2808399
HS	3.2808399
HT	3.2808399
HU	3.2808399
HW	3.2808399

```
HX 3.2808399
HY 3.2808399
HZ 3.2808399
IC 1.0
IE 0.6213712
IO 3.2808399
IR 1.0
IT 0.3937008
LA 247.10541
LC 0.8107131
LS 0.8107131
MD 1.0
MI 1.0
ML 0.3937008
MM 1.0
MN 1.0
MS 1.0
MT -1.0
MU 0.3937008
MV 1.0
MW 1.0
NC 1.0
NG 3.2808399
NL 1.0
NN 1.0
NO 1.0
NS 1.0
PA 0.295297
PC 0.0393701
PD 0.295297
PE 1.0
PL 10.
PF 0.0393701
PM 1.0
PN 0.0393701
PP 0.0393701
PR 0.0393701
PT 1.0
PY 0.0393701
QA 0.0353147
QB 0.0393701
QC 0.8107131
QD 0.0353147
QE 1.0
QF 0.6213712
QG 0.0353147
QI 0.0353147
QL 0.0353147
QM 0.0353147
QN 0.0353147
QP 0.0353147
QR 0.0353147
QS 0.0353147
QT 0.0353147
```

```
QU 0.0353147
QV 0.8107131
QW o.0353147
QX 0.0353147
QY 0.0353147
RA 1.0
RI 1.0
RN 1.0
RP 1.0
RT 1.0
RW 1.0
SA 1.0
SD 0.3937008
SF 0.3937008
SI 0.3937008
SL 0.00328084
SR 1.0
SS 1.0
ST 1.0
SW 0.0393701
TA -1.0
TB 1.0
TC -1.0
TD -1.0
TE 1.0
TF -1.0
TH -1.0
TM -1.0
TN -1.0
TP -1.0
TS -1.0
TV 1.0
TW -1.0
TX -1.0
UC 0.6213712
UD 1.0
UG 2.2369363
UL 0.6213712
UP 1.0
UQ 1.0
UR 1.0
US 2.2369363
VB 1.0
VC 1.0
VE 1.0
VG 1.0
VH 1.0
VJ 1.0
VK 1.0
VL 1.0
VM 1.0
VP 1.0
VQ 1.0
VR 1.0
```

```
VS 1.0
VT 1.0
VU 1.0
VW 1.0
WA 1.0
WC 1.0
WD 0.3937008
WG .0393701
WH 1.0
WL 1.0
WO 1.0
WP 1.0
WT 1.0
WV 3.2808399
XC 1.0
XG 1.0
XL 1.0
XP 1.0
XR 1.0
XU 2.2883564
XV 0.6213712
XW 1.0
YA 1.0
YC 1.0
YF 1.0
YR 1.0
YS 1.0
YT 1.0
*2 0
A   1008
B   1002
C   0015
D   2001
F   1004
H   1001
I   0000
J   0030
K   1012
L   1018
M   3001
N   2015
P   5004
Q   1006
R   5002
S   5001
T   1003
U   0001
V   5003
W   2007
X   5005
Y   4001
Z   5000
*3  0
1G  1
```

```
1M  1
1P  1
1R  1
1Z  1
2G  1
2M  1
2P  1
2R  1
2Z  1
3G  1
3M  1
3P  1
3R  1
3Z  1
4G  1
4M  1
4P  1
4R  1
4Z  1
5G  1
5M  1
5P  1
5R  1
5Z  1
6G  1
6M  1
6P  1
6R  1
6Z  1
7G  1
7M  1
7P  1
7R  1
7Z  1
8G  1
8M  1
8P  1
8R  1
8Z  1
9G  1
9M  1
9P  1
9R  1
9Z  1
C1  1
C2  1
C3  1
C4  1
C5  1
C6  1
C7  1
C8  1
C9  1
CA  1
```

```
CB  1
CC  1
CD  1
CE  1
CF  1
CG  1
CH  1
CI  1
CJ  1
CK  1
CL  1
CM  1
CN  1
CO  1
CP  1
CQ  1
CR  1
CS  1
CT  1
CU  1
CV  1
CW  1
CX  1
CY  1
CZ  1
FA  1
FB  1
FC  1
FD  1
FE  1
FF  1
FG  1
FM  1
FN  1
FP  1
FQ  1
FU  1
FV  1
FW  1
FX  1
FZ  1
HA  1
HB  1
HC  1
HD  1
HE  1
HF  1
HG  1
HH  1
HI  1
HJ  1
HK  1
HL  1
HM  1
```

```
HN  1
HO  1
HP  1
HQ  1
HR  1
HS  1
HT  1
HU  1
HV  1
HW  1
HX  1
HY  1
HZ  1
MA  1
MC  1
MH  1
MK  1
MS  1
MT  1
MW  1
PA  1
PB  1
PC  1
PD  1
PE  1
PF  1
PG  1
PH  1
PI  1
PJ  1
PK  1
PL  1
PM  1
PN  1
PO  1
PP  1
PQ  1
PR  1
PS  1
PT  1
PU  1
PV  1
PW  1
PX  1
PY  1
PZ  1
R2  1
R3  1
R4  1
R5  1
R6  1
R7  1
R8  1
R9  1
```

```
RA  1
RB  1
RC  1
RD  1
RF  1
RG  1
RM  1
RP  1
RR  1
RS  1
RT  1
RV  1
RW  1
RX  1
RZ  1
ZZ  1
*4  0
D   1
E   1
F   1
G   1
H   1
I   1
J   1
K   1
L   1
M   1
N   1
P   1
R   1
S   1
T   1
U   1
V   1
W   1
X   1
Y   1
Z   1
*5  0
A 0.002
B 0.004
C 0.01
D 0.02
E 0.04
F 0.05
G 0.25
H 0.75
J 0.0013
K 0.0228
L 0.1587
M -0.5
N 0.8413
P 0.9772
Q 0.9987
```

```
T 0.95
U 0.96
V 0.98
W 0.99
X 0.996
Y 0.998
Z  -1.0
1  0.1
2  0.2
3  0.3
4  0.4
5  0.5
6  0.6
7  0.7
8  0.8
9  0.9
*6 0
AD ADZZZZZ 0
AT ATD 0
AU AUD 0
AW AWD 0
EA EAD 0
EM EMD 0
EP EPD 0
ER ERD 0
ET ETD 0
EV EVD 0
HY HGIRZZZ 1
HN HGIRZNZ 0
HX HGIRZXZ 0
LC LCD 0
PF PPTCF 0
PP PPD 0
PR PRD 0
PY PPDRZZZ 1
QC QCD 0
QN QRIRZNZ 0
QV QVZ 0
QX QRIRZXZ 0
QY QRIRZZZ 1
RI RID 0
RP RPD 0
RT RTD 0
TC TCS 0
TF TFS 0
TH THS 0
TN TAIRZNZ 0
TX TAIRZXZ 0
SF SFD 0
UC UCD 0
UL ULD 0
XG XGJ 0
XP XPQ 0
** 0
```

```
If altering this file, be very careful!
The program looks for the key delimiters,
*1, *2, *3, *4, *5, *6, **.  Values can be
added in between the delimiters. The input
file ends with **.

The program, is currently set to handle
the following number of values:
PE  250
D    35
TS  180
E    30
P    40
SEND 45
If you want more, you will need to increase
the array sizes in the program, and recompile.

When adding send codes in the section
beginning with *6, be sure to enter all
three values on each line entered. The
three values should be the 2 character
send code, the translated PEDSTEP, followed
by either a 0 or 1,depending upon if the
sendflag it off or on.
```

Attachment C - Example Log File

```
  LOG FOR SHEF PARSING & POSTING - Program: shef_decode_pro
  LOG_START_TIME------------->  00:00 11/17/02   (1037491210)
  LOG_CURRENT_TIME----------->  23:59 11/17/02   (1037577593)

< PARSING STATISTICS >
  #PRODUCTS      #RECORDS      #ERRORS     #WARNINGS
          0             0            0             0
< INSERT/UPDATE RECORDS STATISTICS >
  #INSERTS       #UPDATES
          0             0

< ARRAY POSTING STATISTICS >
     P1SNOW P1GOES1DEFALT P2SNOW P2GOES UNKNWN P3SNOW P3GOES UNKNWN   S.DOM
LARCSDEFAULT
PE      1M     1G     1Z     2M     2G     2Z     3M     3G     3Z     RG
 RP     RZ  TOTALS
PPH      0      0      0      0      0      0      0      0      0      0
  0      0       0
PPQ      0      0      0      0      0      0      0      0      0      0
  0      0       0
PPD      0      0      0      0      0      0      0      0      0      0
  0      0       0
HGH      0      0      0      0      0      0      0      0      0      0
  0      0       0
TAH      0      0      0      0      0      0      0      0      0      0
  0      0       0
TA       0      0      0      0      0      0      0      0      0      0
  0      0       0
QR       0      0      0      0      0      0      0      0      0      0
  0      0       0
LS       0      0      0      0      0      0      0      0      0      0
  0      0       0
  0      0       0
QI       0      0      0      0      0      0      0      0      0      0
  0      0       0
         0      0      0      0      0      0      0      0      0      0
  0      0       0

     00:00  00:00  00:00  00:00  00:00  00:00  00:00  00:00  00:00  00:00
00:00  00:00
```